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The EDITH *and* LORNE PIERCE
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Queen's University at Kingston

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A
NEW SYSTEM
OF
WOODEN RAILWAYS,
BY
J. FOSTER.

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NEW SYSTEM OF WOODEN RAILWAYS.

About three months ago, I submitted some remarks to the public on this subject, and accompanied them with a plan and estimate of the expense of construction according to the price of labour and material as supplied in Montreal, since that time I have been occupied in examining these points in detail, both as to formation and cost; the question of a cheap, but more particularly of a durable and substantial wooden railway, being at the present moment one of increasing interest, and of the very highest importance.

Through the kindness of Mr. Irving, president of the railway between Lanora and Industry, I obtained permission to lay down on that line a short length of my system, and from the complete success which has attended this experiment, I feel justified in calling the attention of those interested in the subject, more in detail, to its cost and advantages.

The line, where the new rails are now at work, has its old road constructed with wooden longitudinals bearing on, and keyed into cross ties, on the top of each of the longitudinals is a flat bar of iron spiked down; the locomotives are about 14 to 15 tons weight, and their usual speed about 12 miles per hour. It is to an inspection of this short piece of experimental line that I beg to call the attention of those companies who are interested in the great question of wooden railways, and to those unable to inspect, to a consideration of the advantages achieved by the system.

1st. As regards cost, a road on this system as shewn by the plan and

section accompanying these remarks, and laid ready to receive the rolling plant, can be made at the following prices :

A line suitable for locomotives of 10 tons weight, running 12 miles an hour, \$0.54 per lineal yard.

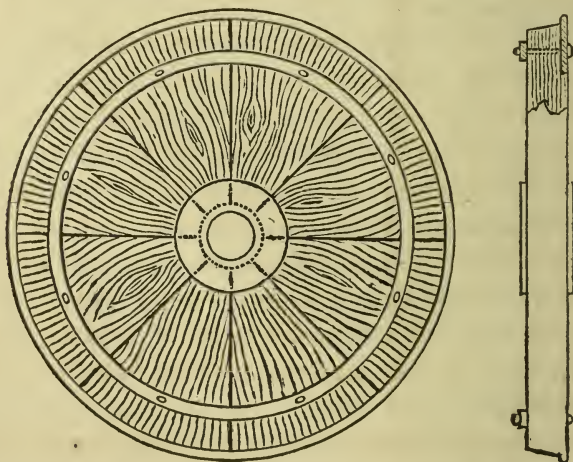
Do. do. for locomotives 20 tons at 20 miles per hour, \$0.74 per lineal yard.

Do. do. for locomotives 50 tons at 25 miles per hour, \$1.28 per lineal yard.

Compared to this, the *simple bar of iron alone*, required by the Industry Company, for their repairs, *costs more per yard*, leaving out of the question, the cost of the longitudinals under this iron, boring the holes in the iron for spiking it down, the spikes, the cross ties, and the laying of the road. I, therefore, claim as one of the advantages of this system, the construction of a more substantial line of wooden railway than any now in use, with economy and durability.

2nd. Durability. The piece now laid shows no symptoms whatever of yielding. As a proof of the power of resistance of hard wood in its *proper position*, I will refer to some experiments in which I was engaged in England some 20 years ago, with wooden railway *wheels*, the tyre or periphery of the wheel I mean being made of wood ; the segments composing the wheel were arranged in a cast iron nave with the *grain endings*, as shewn in the accompanying sketch A.

A



—the segments being supported laterally by a hoop of iron on either side near the periphery. These wheels ran many hundred miles without

apparent wear, but when the brake came to be applied, and the wheel had to slide down an incline for a mile or two on one point of its circumference, a flat place became inevitable and the wheel was rendered useless.

With a rail, the action is just the reverse, the timber forming the running surface of the rail is made with hard wood, *grain endways* as in the wheel, but is exempt from the only single cause of destruction to the wheel, viz., great unequal pressure proceeding from the action of the break. Again, look at the durability of wood, as applied to the gearing of large mill wheels, through which a power of from fifty to a hundred horses may be passed every day for 10 years before it is worn out; or again to the steps of scores of upright shafts in mills in this country, where a piece of hard wood, with the grain in the right position is found to stand the heavy pressure and constant grinding better than any other material.

3rd. The road is comparatively noiseless, smooth, and without vibration; conditions which cannot be obtained on any railway where iron and iron work together, and a wooden railway really without iron, I have never before heard of, as *commercially practicable*.

They have been tried in this country and failed, they are now being tried in the United States, but from the returns I have seen the cost of traction must be frightful, but whatever system may be adopted, let the Directors beware of proving again what has been so often proved before, viz., that the *cheapest* is very often the *dearest*. Upon the good condition and stability of the permanent way of every railway, depends more than upon any other single cause, the economy of by far the greater part of the working expenses, as well as the general safety of the line.

These conditions I maintain are combined in my system, thus reducing the wear and tear of locomotives, tyres and rolling stock, to a minimum, rendering also the line more agreeable and less fatiguing to travellers, thereby tending to increase the traffic, and at the same time reduce the item of repairs.

4th. The facility of repairs, is also great, as any piece forming the rail can be removed by driving back two wooden pins, and without lifting the rails, be replaced by another.

I think if these statements are proved by the piece of line actually in operation, that the principal is worthy of the consideration of those companies about to be engaged in carrying out the wooden lines.

J. FOSTER.

MONTREAL, May 27th 1869.

EXPLANATION.

FIG. 1—Represents, on a large scale, a cross-section of one rail on the line *a. b.* in Plan at Fig. 2.

a. Fig. 1, shews the hard wood end-ways; *b.b.* the two side pieces or longitudinals, between which the hard wood blocks, forming the running surface for the train, are fixed.

FIG. 1.

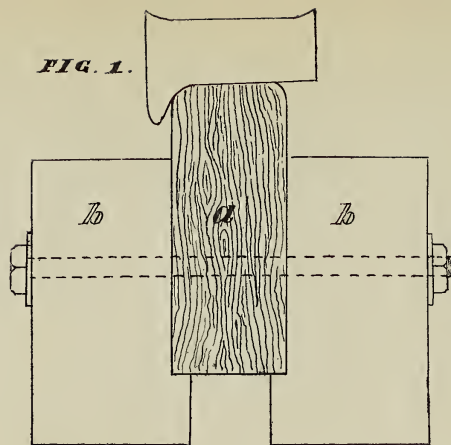


FIG. 2—Is a plan representing about 40 feet of the permanent way, shewing how the joints of the longitudinals are made to extend over 3 feet, one half of each resting on cross-ties, 3 feet apart, as shewn at *c. c. c. c.* The other cross-ties are 4 feet 6 inches apart.

FIG. 3—Is an elevation of the rail, shewing the ends of the cross-ties.

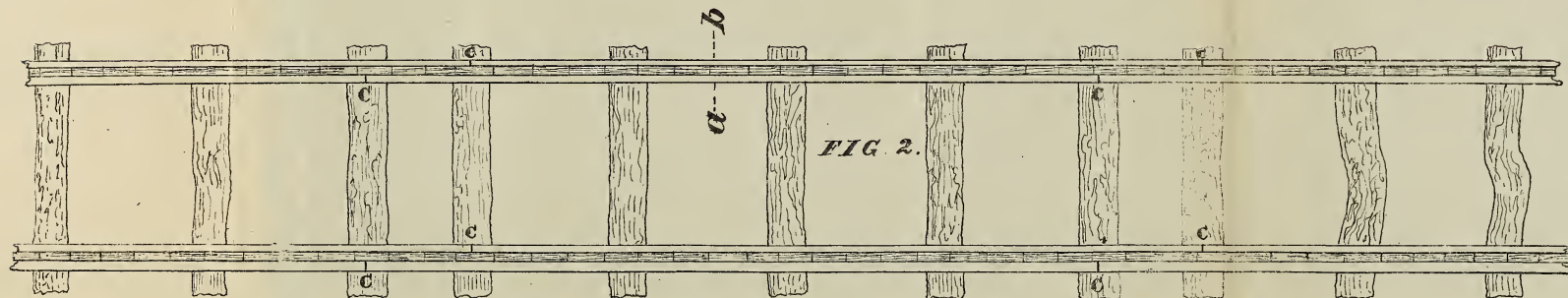
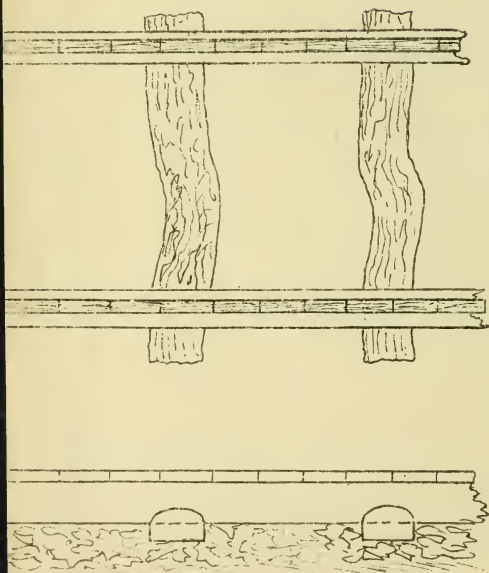


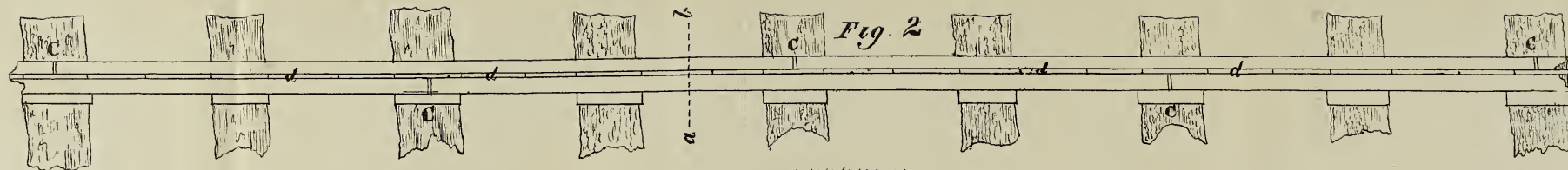
FIG. 3.



representing about 40 feet of the
the joints of the longitudinal's
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newn at c. c. c. c. The other
apart.

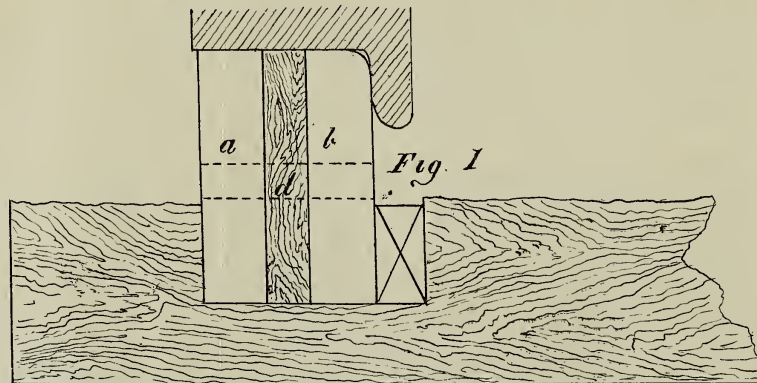
of the rail, skewing the ends





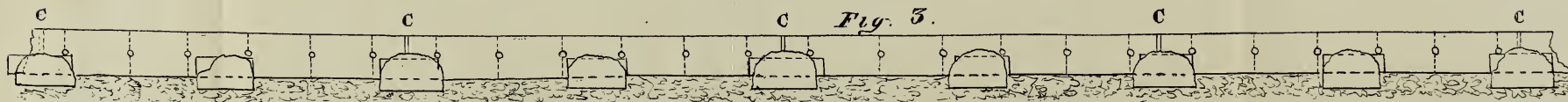
EXPLANATION.

Figs. 1, 2 and 3.—Represent a cheap modification for the arrangement of the Grain end-ways.—Fig. 1.—Represents a cross-section of the rail at *a. b.* Fig. 2.—The two longitudinals *a. b.* Fig. 1, are exactly together equal in area, to the plain wood rail proposed to be used in this country, but are stronger, as they will have no through joint, but will overlap 6 feet as shewn at *c. c. c. c.* Figs. 2 and 3.



d. d. d. Figs. 1 and 2.—Represent the blocks of hard wood—Grain end-ways; which will afford with scarcely any perceptible increase in its cost, a rail of very much longer life and very superior adhesion for the Locomotive.

Fig. 3.—Shews the blocks by dotted lines with a wooden pin between each—the whole resting on sleepers and keyed in the usual way.





MARMORA RAILROAD.

CHAIRMAN'S REMARKS AND ENGINEER'S REPORT.

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